Add new claims 19 and 20, as follows:

19. The method according to claim 1 wherein there is a change in the calculated volume which defines a threshold below which the iterative division is stopped.

20. The method according to claim 1 wherein each segment or subsegment is divided by a perpendicular to the segment or subsegment.

REMARKS

Claims 1 to 18 are pending in the application. Claims 1 to 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for the reasons indicated in the office action. Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification as filed. None of the claims presently in the application are rejected over the prior art cited in the office action. The drawings are objected to for the reasons indicated in the office action. The specification is objected to for the reasons indicated in the office action. None of the documents supporting the entitlement to a claim for priority under 35 U.S.C. 119 have been submitted.

Enclosed herewith is a petition under 37 CFR 1.137(b) to revive this application as being unintentionally abandoned.

Enclosed is a proposed substitute drawing for Figure 1 in which the features are more clearly shown with respect to the reference characters. This is the best available copy known to the applicant and corresponds to the same figure as filed in and accepted in International Application No. PCT/FR98/02540 and in the priority French Application No. 97 15639. A certified copy of the priority application filed December 10, 1997 by applicant's assignee will be provided in due course. The applicant otherwise requests that any drawing correction be deferred until allowable subject matter has been indicated.

In regard to numbered paragraph 4 of the office action, the specification has been amended at page 4, line 5, as proposed by the examiner.

In regard to numbered paragraph 5(a) of the office action, the features described with respect to Figures 4 and 5 are not the same and accordingly different reference

characters need to be indicated. As shown in the enclosed proposed drawing correction for Figure 5, previous reference numeral 46 is changed to reference numeral 53 and the specification at page 6, line 7 is accordingly amended to conform. The examiner's observation regarding the role of point 47 is correct and the specification has been amended at page 5, line 5.

In regard to numbered paragraph 5(b) of the office action, the examiner is correct.

In regard to numbered paragraph 7 of the office action, the word "films" has been changed to -- images --, the term more commonly acceptable in the art and known to those skilled in the art so as to improve the translation from the French language of the priority application. The phrase "films taken in section" at page 1, line 18, and the phrase "films are taken along parallel sections" at page 2, lines 15/16, described conventional digital imaging according to well-known image reconstruction techniques, such as computerized tomography or magnetic resonance imaging. As is well-known in the art, a "stack of planar slice" images can be electronically and digitally captured so as to thereafter be displayed and manipulated. As is well-known in the art and mathematically a plurality or stack of planar images of an object will define a volume of the object. No claim is being made to the technique in which the images or films are acquired.

The examiner's confusion is noted and the following will assist in understanding the problem to be solved and the solution as described and claimed. The third paragraph beginning with the word "Furthermore" in numbered paragraph 7 of the office action is inaccurate. The invention disclosed and claimed in the present application assumes there is already present and available plurality of images from which can be formed a three-dimensional digital image of an object as shown in Figure 1. As noted in the application as filed, the invention is particularly applicable to medical imagery and the object comprising the "stack of planar slices" can form a three-dimensional image of an object, for example, an organ or a part thereof of the human body under investigation. The object may be of different and varied contours, shapes, contrast and volume. The determination of the volume and shape of the object is useful for any medical procedure, included any surgical

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procedure. The applicant believes that it is difficult to define one or more algorithms which will take into consideration the above noted differences and provide the desired calculation of the shape and volume of the object. Generally it is known in the state of the art to provide the desired calculation by one of three methods: (1) manual contouring, i.e., drawing contours and then adding up the volumes of each image slice; (2) specific image processing dedicated to specific organs or lesions; and (3) stereo imaging. Each of these known techniques is time-consuming and is not a generic solution. What is desired is minimal input from an operator to guide software to define boundaries of contour with the desired level of accuracy. The solution described and claimed in the present application is to iteratively approximate the shape by placing a cursor at the limits of the contour. Figure 2 and 3 are *two*-dimensional schematic views, which are presented to better understand the *three*-dimensional shape and volume imaging described and claimed in the present invention.

As already noted it is well-known that a display of digital images can be manipulated as desired to include rotation in any direction or orientation. As noted in the application as filed at page 4, lines 18/20, once the initial six first point are defined, the image is rotated or oriented to define additional points, i.e., the stack or plurality of planar images is manipulated. It is well-known that five different and appropriately selected points will define a five-sided pyramid. This pyramid can be viewed perspectively, as shown in Figure 5, to have a three-dimensional contour. It is also understood that a five-sided pyramid is a preferable polyhedron volume for computer graphics manipulation. If a sixth point is appropriately selected then the perspective view is two pyramids having a common base. Each segment is divided by a perpendicular to form two additional segments or subsegments, as shown in Figure 3. The process is repeated iteratively until the contour of the object is closely approximated to a desired level or threshold of remaining volume of the contour that has not been divided. This is illustrated in the enclosed Exhibit A in which Figure 3 the representative segment 36 is further succesively divided by a perpendicular to define two representative subsegments. In Exhibit 3A the

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respective representative segment is divided, as shown in red, into two represetative subsegments. Since the process is iterative, it can be continue for each segment, as representatively shown in green in Exhibit 3B, until the desired approximation of the contour of the object is achieved or preset threshold is reached for the approximation. Figure 3 and Exhibit A is illustrative of a *two*-dimensional approximation of a planar object and would result in an approximation of area. However, if the object is rotated or oriented in any direction and the process iteratively repeated, i.e., *three*-dimensionally, the result is an approximation of the volume of the object.

In regard to numbered paragraph 8 of the office action, claim 16 has been canceled.

In regard to numbered paragraphs 9 and 10, claim 1 and paragraph a), claims 1, 4 to 6 and 14 have been amended to remove the indefiniteness. It should be noted that the examiner's observations in a) are inaccurate as can be understood from the above clarification. In regard to claim 1, paragraph b), claim 1 has been amended accordingly. The applicant wishes to advise the examiner that step (b) of claim 1 defines a triangular polygon.

In regard to claim 2, the examiner is correct and the claim has been amended accordingly..

In regard to claim 3, the examiner is correct and the claim has been amended accordingly.

In regard to claims 7 to 14, these claims have been amended accordingly.

In regard to claim 14, the claim has been amended accordingly.

In regard to claim 15, the "six base points" are part of the given number of base points of original claim 1, line 4 and are not new base points.

In regard to claims 17 and 18, "the points" refer to all the points and not the base points or the second rank points or the third rank points.

The applicant requests reconsideration of the application as amended and after such reconsideration an office action indicating allowability of subject matter.
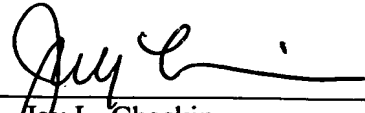
Respectfully submitted,

KNOPLIOCH ET AL.
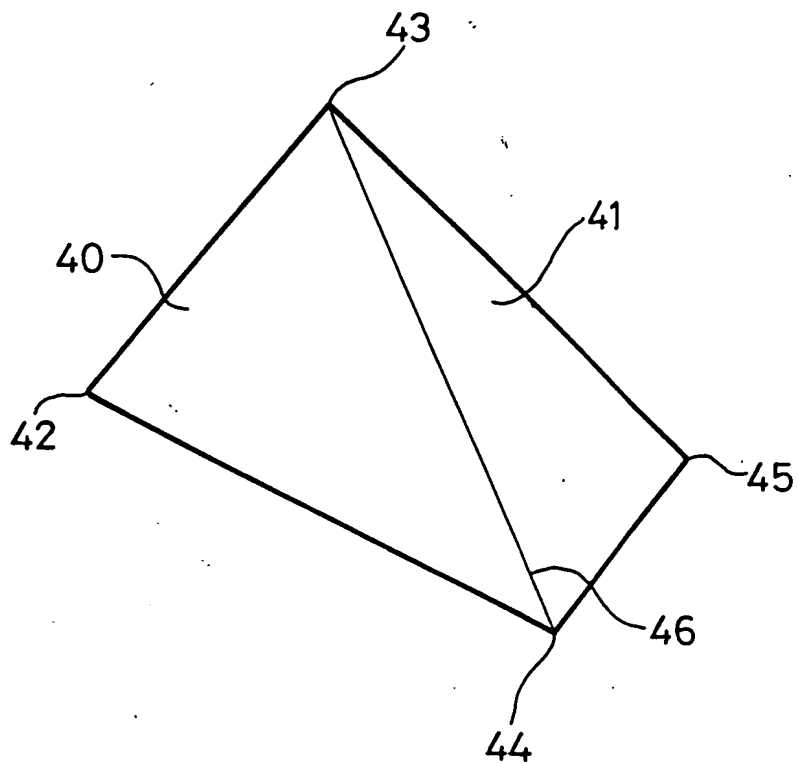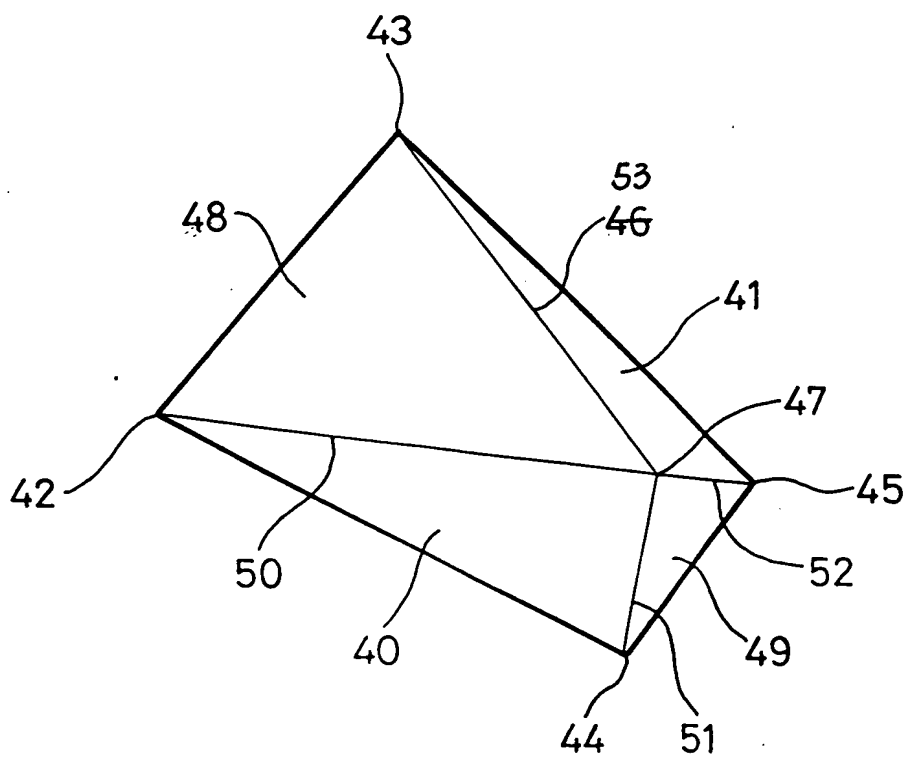
By _____

Jay L. Chaskin
Attorney for Applicant

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FIG.4

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FIG.5

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EXHIBIT A